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### THE SARCOPHAGINÆ AND THEIR RELATIVES IN NEW YORK. II<sup>1</sup>

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LANCASTER, PA.

*Sarcophaga* Meigen

1826. Meigen, Syst. Besch. Zwei. Ins., vol. 5, p. 14.

1916. Aldrich, *Sarcophaga* and Allies, p. 5.

Aldrich (1916) gave a full account of the history of the genus, *Sarcophaga*, and the distinguishing characters which will not be repeated here. The hypopygial studies have given additional evidence that there can be some grouping of the species within the genus. These structures are more important as the final characters to be used in distinguishing some of the closely related species.

The New York species (*bisetosa*, *cimbicis*, and *latisterna*), which Parker (1914) placed in the genus *Boettcheria*, have several common genitalic characters. There is a small rounded projection on each side of the V of the fifth sternum a short distance before its point of union. The sperm pump sclerite of each of these three species is thickened along the margin of its larger end and they are similar in size and shape. The posterior claspers of the three species are more or less enlarged on the front side near the base.

<sup>1</sup> This article is a continuation of "The Sarcophaginæ and their relatives in New York. I." JOUR. N. Y. ENT. SOC. vol. 48, pp. 127-153, 1940.

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The New York species (*laakei*, *latisetosa*, *l'herminieri*, *pusiola*, *stimulans*, and *sueta*) of the *Ravinia* group have many similar hypopygial structures. When the anal forceps are viewed from the back it is noticeable that each is united near its base, becomes widely separated and then generally tend to be closer together at the apex. There is a remarkable resemblance in the shape of the ædeagus of these five species as will be seen by examining the illustrations. Three species, *l'herminieri*, *sueta*, and *pusiola* have a similar arrangement of short, stout bristles along each inner margin of the V of the fifth sternite. The species, *laakei*, *latisetosa*, and *stimulans*, do not have this striking bristle arrangement but are similar to each other as they have an enlargement on the inner margin of the V of the fifth sternite.

It is evident that *barbata* and *securifera* are closely related. Although the anal forceps can be distinguished they have a striking resemblance in their shape. Each species has a broad accessory plate, a row of bristles along the posterior margin of the anterior claspers, two bristles on the front margin near the apex of the posterior claspers, considerable similarity in the shape of the fifth sternites and the arrangement of the bristles along the inner margins of the V of their fifth sternites.

There is some similarity in the ædeagus and anal forceps of *alcedo* and *uncata* but the shape of the fifth sternites would not lead one to expect very close relationship between these two species. Aldrich (1916) compared both of these species to *excisa*. There are several species in this group that have many characters in common but they are not as closely related to each other as the species within the *Ravinia* or *Boettcheria* groups.

It is true that there are distinct groups within the genus *Sarcophaga*. Yet it does not seem wise to attempt to express this relationship by creating separate genera for these related species. In almost all the cases it would be nearly impossible to find generic characters which would place the females in the proper genus. The writer desires in the near future to study the hypopygial structures of the female *Sarcophaga* which may help to show relationships within the group. It would also be wise to supplement these characters by comprehensive larval studies of the type conducted by Knipling (1936) and studies of the habits of the related species.

Although there is a very striking similarity in the appearance of the adult *Sarcophaga*, the habits of the immature stages show considerable variation. As Aldrich (1916) brought to our attention these flies are now in the interesting transition from the habit of devouring dead animal tissues to parasitism upon living tissue. The larvæ of the *Ravinia* group develop in excrement. There are many *Sarcophaga* which have the habit of developing in dead flesh as illustrated by *Sarcophaga bullata*. The aquatic *Sarcophaga*, which develop in pitcher plants, feed largely upon dead insects but they will attack and kill living insects which occur in the water found in the pitcher plant. There are many true parasitic forms in the *Sarcophaga* and these may be illustrated by *S. atlansis*, which attacks grasshoppers, *S. aldrichi*, which attacks chiefly the forest tent caterpillar, and *S. cimbicis*, which has a wide variety of hosts. Although *S. cimbicis* may develop as a true parasite the larvæ have also been reared on meat. The habits of the New York species will be discussed more fully under each individual species.

The keys given in the present paper include all Sarcophaginæ known to occur in New York state in order that the identification of the flies may be made simpler and confusion avoided. Characters other than those found on the genitalia have been used whenever possible in the first key to the males. A second key to the males, which is based entirely upon genitalia characters, has been given in order to aid the student in the study of this group. The third species key deals with the female Sarcophaginæ of New York where known material has been available for study.

Genotype.—*Sarcophaga carnaria* (Linn.)

KEY TO SEPARATE MALE SARCOPHAGINÆ

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|--|----|
| 1. Three distinct postsutural dorsocentrals .....  | 2  |
| Four postsutural dorsocentrals, or else the anterior ones of the postsutural series indistinct, scarcely differentiated from hairs ..... | 31 |
| 2. Hind tibiæ with villosity, the hairs of which are at least longer than the diameter of the tibiæ .....                                | 3  |
| Hind tibiæ without erect villosity (the appressed hairs at most not longer than the diameter of the tibiæ) .....                         | 9  |
| 3. Hypopygium entirely black .....   | 4  |
| At least the second segment of the hypopygium red or yellow .....  | 5  |

4. Abdomen pollinose, at most the hinder parts of the segments shining black; middle femur with a patch of yellow hairs on the apical third of front sides.....*Sarcophaga sinuata* Meig.  
Abdomen with three rows of shining black spots on the second, third, and fourth segments; middle femur without yellow hairs  
*Wohlfahrtia vigil* Walker
5. Anterior acrostichals present ..... 6  
Anterior acrostichals absent ..... 8
6. Prescutellar bristles present, the third abdominal segment with a complete row of marginal bristles.....*Sarcophaga sarracenæ* Riley  
Prescutellar bristles absent, the third abdominal segment with only median marginal bristles ..... 7
7. Accessory plate long, slender, finger-like, only the distal end of the row of median bristles on the hind femur present  
*Sarcophaga latisterna* Parker  
Accessory plate not finger-like, a complete row of median bristles on hind femur.....*Sarcophaga cimbcis* Townsend
8. Third abdominal segment with a complete row of marginal bristles, fourth abdominal segment yellow apically.....*Sarcophaga sima* Aldrich  
Third abdominal segment with only a median pair of marginal bristles, fourth abdominal segment entirely black  
*Sarcophaga bisetosa* Parker
9. Hypopygium entirely black..... 10  
At least second segment of the hypopygium red or yellow..... 17
10. The frontal bristles extending below the base of the antennæ ..... 13  
The frontal bristles not extending below the base of the antennæ..... 11
11. Arista short plumose ..... 12  
Arista long plumose; legs largely yellow; abdomen largely yellow in the light form and abdomen dark in the dark form  
*Opsodexia bicolor* Coq.
12. Legs entirely black; palpi brownish and nearly as long as the proboscis  
*Oppiopsis sheldoni* Coq.  
Tibiæ yellow; palpi yellow and only about one-third the length of proboscis .....*Opelousia obscuria* Town.
13. Anterior acrostichals wanting ..... 16  
Anterior acrostichals present and well developed ..... 14
14. Ground color of ventral portion of abdomen largely red, second and third abdominal segments with only median marginal bristles  
*Sarcophaga fletcheri* Ald.  
Ground color of ventral portion of abdomen black..... 15
15. Accessory plates nearly as long as anal forceps; the V lacking on the fifth ventral sternum .....*Laccoprosopa sarcophagina* Town.  
Accessory plates short; fifth sternite has a well developed V  
*Sarcophaga nox* Hall
16. Palpi yellow, forceps with strong protuberances on dorsal half, on which are striking tufts of long black hair.....*Sarcophaga hunteri* Hough

- Palpi black, foreeeps slender, protuberances and tufts of hair lacking  
*Sarcophaga atlantis* Ald.
17. First, third and fifth longitudinal veins hairy, fourth abdominal segment and hypopygium yellowish red ..... *Johnsoni borealis* Reinhard  
 Only first and third longitudinal veins hairy ..... 18  
 Third longitudinal vein only hairy ..... 19
18. Anterior acrostichals well developed, second abdominal segment with median marginal bristles ..... *Metoposarcophaga importuna* Walker  
 Anterior acrostichals not differentiated from the surrounding hairs, second abdominal segment without median marginal bristles  
*Sarcophaga rapax* Walker
19. Palpi yellow ..... 20  
 Palpi black ..... 22
20. First segment of hypopygium with a row of stout bristles near its base, fifth sternite entire ..... 21  
 First segment of hypopygium without row of bristles near base, the row of bristles at apex often indistinct, fifth sternite deeply cleft forming a distinct V ..... *Sarcophaga hunteri* Hough
21. Arista plumose; parafacials and parafrontals light golden yellow pollinose ..... *Sarcofahrtia ravinia* Parker  
 Arista bare or slightly pubescent; parafacials and parafrontals gray pollinose ..... *Erythrandra picipes* B. & B.
22. Arista long and thin, short-plumose; the second segment of the large hypopygium red and with long bristles ..... *Hypopelta scrofa* Ald.  
 Species not as described ..... 23
23. Anterior acrostichals absent or scarcely differentiated from surrounding hairs ..... *Sarcophaga parallela* Ald.  
 Anterior acrostichals well developed ..... 24
24. Epaulets yellow, frontal rows of bristles not divergent below  
*Sarcophaga pusiola* V. d. W.  
 Epaulets black, the frontal rows of bristles suddenly divergent in the last two or three bristles ..... 25
25. The third abdominal segment with a pair of median marginal bristles, median marginal bristles absent on the second abdominal segment ..... 26  
 Species lacking the above combination of characters ..... 29
26. Wings slightly smoky, hind calypters light brown with a white margin, parafacials and parafrontals yellow pollinose  
*Sarcophaga alcedo* Ald.  
 Species lacking the above combination of characters ..... 27
27. Fourth abdominal segment yellow apically; accessory plate broad and deeply excised at apex ..... *Sarcophaga excisa* Ald.  
 Fourth abdominal segment black; accessory plate round at apex ..... 28
28. Apex of ædeagus with a long tube-like portion which is incurved at end to form a loop that can be seen through ..... *Sarcophaga reversa* Ald.  
 Tip of ædeagus without loop, but with thin expanded margins which are whitish or transparent ..... *Sarcophaga uncatata* V. d. W.

29. Ruffle-like expansions lacking on ædeagus, the minute incurved copulatory tube concealed by the stout divergent prongs at the tip of the ædeagus.....*Sarcophaga aculeata* Ald.  
 On the discal portion of the ædeagus appear lateral, thin expanded margins which are white or transparent and shaped similar to a ruffle ..... 30
30. A pair of erect median marginal bristles on the second abdominal segment, the distal portion of the ædeagus distinctly notched to form two sharp points at the apex.....*Sarcophaga setigera* Ald.  
 Median marginal bristles rarely present on second abdominal segment (when present small and widely separated); distal segment of ædeagus swollen and whitish at end with no sign of notch  
*Sarcophaga coloradensis* Ald.
31. Hind tibiæ with villosity, the hairs of which are at least longer than the diameter of the tibiæ..... 32  
 Hind tibiæ without erect villosity (the appressed hairs are at most not longer than the width of the tibiæ ..... 45
32. Hypopygium entirely black..... 33  
 At least the second segment of the hypopygium red..... 37
33. Middle tibiæ with long dense villosity; front approximately as wide as one eye.....*Sarcophaga johnsoni* Ald.  
 Middle tibiæ without villosity; front much narrower than the width of the eye ..... 34
34. Anal forceps broad, approximately the same width for three-fourths their length; anterior claspers deeply grooved on back  
*Sarcophaga aldrichi* Parker  
 Species lacking the above characters..... 35
35. Ædeagus globose with several long slender processes at apex  
*Sarcophaga misera* var. *harpax* Pand.  
 The long slender processes at apex of the ædeagus lacking..... 36
36. The ædeagus with a large hump on the back; second abdominal segment with median marginal bristles.....*Sarcophaga houghi* Ald.  
 The ædeagus without conspicuous hump on the back; the second abdominal segment without median marginal bristles  
*Sarcophaga montanensis* Hallock
37. First segment of hypopygium black on apical half..... 38  
 Both segments of hypopygium yellow or reddish in color..... 41
38. The prescutellar bristles absent; the forceps with a notch behind near base.....*Sarcophaga hæmorrhoidalis* Fall.  
 Species lacking the above characters ..... 39
39. A single row of black hairs back of eyes, abundant white beard which extends over the back of the head up to the row of black hairs behind eyes.....*Sarcophaga securifera* Vill.  
 With more than one row of black hairs back of eyes and white beard less extensive ..... 40

40. Forceps without emargination and hump behind; ædeagus with slender processes at tip; two rows of black cilia behind eyes; white hair on posterior portion of cheeks.....*Sarcophaga misera* var. *exuberans* Pand.  
Forceps with an emargination behind followed by a hump, terminal portion of ædeagus much enlarged and no slender processes  
*Sarcophaga barbata* Thompson
41. The middle tibiæ with long villosity, which begins about the middle..... 42  
Middle tibiæ without long villosity..... 43
42. The length of villous hair on hind tibiæ approximately twice the diameter of the tibiæ; length of villous hair on middle tibiæ approximately equal to the diameter of tibiæ  
*Sarcophaga scoparia* var. *nearctica* Parker  
The length of villous hairs on hind tibiæ approximately three times the diameter of the tibiæ; length of villous hairs on middle tibiæ twice the diameter of tibiæ.....*Sarcophaga fulvipes* var. *triplasia* V. d. W.
43. Third abdominal segment without median marginal bristles  
*Sarcophaga cooleyi* Aldrich  
Third abdominal segment with median marginal bristles..... 44
44. Forceps not tapering to a point but with an apical tooth formed by an excision on the front edge; distal segment of ædeagus not unusually broad, with long slender processes at tip; three rows of black cilia behind eyes; hairs on cheeks black  
*Sarcophaga misera* var. *sarracenioides* Ald.  
Forceps tapering to a sharp point; distal segment of ædeagus broad and blunt.....*Sarcophaga bullata* Parker
45. First vein hairy..... 54  
First vein bare..... 46
46. Epaulets yellow..... 47  
Epaulets black..... 48
47. Fourth segment of abdomen and first segment of hypopygium widely yellowish red; parafrontals and parafacials yellow pollinose  
*Sarcophaga sueta* V. d. W.  
Fourth segment of abdomen and first segment of hypopygium black; parafrontals and parafacials gray pollinose  
*Sarcophaga l'herminieri* Rob.-Des.
48. Palpi yellow, pale hairs of beard conspicuous in front of metacephalic suture.....*Sarcophaga flavipalpis* Ald.  
Palpi entirely black..... 49
49. Scutellum with a pair of apical bristles between the large marginal bristles ..... 50  
The apical bristles on the scutellum lacking ..... 52
50. Frontal bristles extending below the base of the antennæ and the last two or three bristles in the frontal rows divergent; parafrontals and parafacials gray pollinose..... 56  
Frontal bristles not extending below the base of antennæ and not divergent; parafrontals and parafacials golden yellow pollinose..... 51

51. Fourth abdominal segment and the hypopygial segments covered with golden yellow pollinose hairs ..... *Macronichia aurata* Coq.  
 Fourth abdominal segments and the hypopygial segments covered with only gray pollinose..... *Macronichia confundens* Town.
52. Front approximately as wide as one eye ..... *Sarcophaga cistudinis* Ald.  
 Front much narrowed below the ocelli so that it is about half as wide as one eye ..... 53
53. Anterior acrostichals present; fourth abdominal segment black apically; legs yellow..... *Sarcophaga ventricosa* V. d. W.  
 Anterior acrostichals absent; fourth abdominal segment yellow apically; legs black..... *Sarcophaga cingarus* Ald.
54. First segment of the hypopygium red and fourth abdominal segment partially red..... *Sarcophaga laakei* Hall  
 First segment of the hypopygium black and fourth abdominal segment black ..... 55
55. Outer vertical bristles present..... *Sarcophaga latisetosa* Parker  
 Outer vertical bristles absent..... *Sarcophaga stimulans* Walker
56. Forceps with dense erect short hairs almost at tip..... *Sarcophaga utilis* Ald.  
 Short erect bristly hairs lacking near tip of forceps..... 57
57. Forceps parallel to the tip, cut bluntly at tip, and the two forceps curved beneath so as to give a spoon appearance when viewed beneath  
*Sarcophaga niagarana* Parker  
 Forceps parallel more than three-fourths the length but tips widely separated so as to form a semi-circle when viewed from behind  
*Sarcophaga yorkii* Parker

## KEY TO SEPARATE MALE SARCOPHAGINÆ

## BASED ON HYPOPYGIAL CHARACTERS

1. Fifth sternite cleft, so that two lobes extend caudad, generally forming a V ..... 3  
 Fifth sternite entire with no sign of a V on its caudal margin ..... 2
2. Both segments of hypopygium black ..... *Wohlfahrtia vigil* Walker  
 Both segments of hypopygium red ..... *Sarcophaga ravinia* Parker
3. First segment of hypopygium large, flat behind so that the abdomen appears truncate; pump sclerite unusually large as its diameter is twice the length of the ædeagus  
*Metoposarcophaga importuna* Walker  
 First segment of hypopygium normal; pump sclerite small ..... 4
4. Fifth sternum with a pair of median pad-like projections at the point where the gradual sloping V suddenly becomes nearly parallel sided on the caudal margin (*Bættcheria* group) ..... 5  
 The V of the fifth sternum without pad-like projections ..... 7
5. The tip of the ædeagus long and extending cephalad with a number of slender processes beneath; posterior claspers normally slender  
*Sarcophaga latisterna* Parker  
 The tip of the ædeagus strongly curved back caudad; posterior claspers with a decided enlargement near their middle ..... 6



6. Anal forceps short and wide, basal half or more with tufts of very striking long, black hair; anterior clasper with tooth of apex  
*Sarcophaga cimbicis* Town.  
 Anal forceps longer, curved at tip and without striking tufts of hair; anterior claspers curved at apex .....*Sarcophaga bisetosa* Parker
7. Apex of ædeagus with two black transverse arms which curve around forward and make an almost perfect ring and each arm is divided into two points at the apex  
*Sarcophaga scoparia* var. *nearctica* Parker  
 Ædeagus without the characteristic arms ..... 8
8. Anal forceps cleft approximately two-thirds or more of the distance from the tip to the base ..... 9  
 Anal forceps cleft only a short distance or not more than half way from the tip to the base ..... 22
9. Anal forceps nearly straight in profile with a notch behind near base of cleft; arising from the front side of the ædeagus a little before the tip are a pair of curved arms reaching forward which together with the flat and enlarged tip suggest the figure of a small dog sitting up in the attitude of begging  
*Sarcophaga hæmorrhoidalis* Fall.  
 Species lacking the above characters ..... 10
10. Distal segment of the ædeagus in the form of a long tube which is incurved at the end and forming a loop that can be seen through in profile beyond the lateral processes .....*Sarcophaga reversa* Ald.  
 Distal portion of ædeagus without loop that can be seen through ..... 11
11. Forceps when viewed from back show a deep depression on the caudal side about the middle ..... 12  
 Forceps without the depression ..... 16
12. The yellow forceps rather square at the tip, and the base of the forceps enlarged into a prominent lobe which bears a striking tuft of straight black hairs twice as long as the forceps  
*Sarcophaga hunteri* Hough  
 Anal forceps without lobe and tuft of black hairs ..... 13
13. Fifth sternite large, the V is cut out somewhat in the form of a semi-circle, the lower portion of the V margined with strong bristles; distal segment of ædeagus large with a keel-like hind margin which extends in a curve over the tip into a pronounced free hook turned forward .....*Sarcophaga flavipalpis* Ald.  
 Species lacking the above characters ..... 14
14. Inner margins of anal forceps parallel for half of distance to the points, then suddenly turned outward so that the points of forceps are widely separated; the margins of the V of the fifth sternite parallel over half the distance to the point and then suddenly divergent so that points are widely separated, a group of stout bristles on inner margins about one-third distance from points  
*Sarcophaga alcedo* Ald.  
 Species lacking the above characters ..... 15

15. Fifth sternite with a bristly projection on each of the inner margins of the V at about its middle; ædeagus without ruffle  
*Sarcophaga atlantis* Ald.  
 Fifth sternite without projection on the inner margins of the V; ædeagus with a lateral white fringe or ruffle on its apical half  
*Sarcophaga uncata* V. d. W.
16. Anal forceps widely separated from each other at tip and at base attached to each other only for a short distance; bristles confined largely to outer margins of forceps; the usual V-shaped cleft of the fifth sternite is a linear fissure in this species and on each side of the fissure behind is a small black hood-like point  
*Sarcophaga fletcheri* Ald.  
 Species without these characters (*Ravinia* group) ..... 17
17. Anterior claspers with a row of bristles extending the entire length of caudal margin ..... 18  
 Anterior claspers without bristles on caudal margin ..... 19
18. Aedeagus when viewed from behind decidedly narrowed before the apex; anal forceps less widely separated at tip than at one-fourth of distance toward base ..... *Sarcophaga l'herminieri* R.-D.  
 Ædeagus when viewed from behind not narrowed; anal forceps gradually divergent toward apex ..... *Sarcophaga sueta* V. d. W.
19. Ædeagus ending in two rounded enlargements separated by a median notch, on front side well before the apex are two pairs of processes projecting forward ..... *Sarcophaga pusiola* V. d. W.  
 The ædeagus without rounded enlargements ..... 20
20. Anterior clasper terminating in point and nearly as long as ædeagus; posterior clasper slender and smooth on front side; fifth sternite broadly excised ..... *Sarcophaga stimulans* Walker  
 Anterior clasper much shorter than ædeagus; posterior clasper with two small humps on front margin near tip; the fifth sternite less broadly excised ..... 21
21. Anterior clasper hallowed out or dished on front margin at tip so that it has the appearance of being toothed ..... *Sarcophaga latisetosa* Parker  
 Anterior clasper ending in a point without any dished appearance on front margin ..... *Sarcophaga laakei* Hall
22. The V of fifth sternite narrowed almost to a linear fissure; forceps when viewed from side are turned back near the apex to appear somewhat like the barb of a hook ..... *Sarcophaga ventricosa* V. d. W.  
 The V of fifth sternite normal; anal forceps without barbed-like appearance ..... 23
23. Anal forceps black, broad and with shining area on lower half when viewed on the caudal side; anterior claspers large and deeply grooved on front side almost to the apex  
*Sarcophaga aldrichi* Parker  
 Anal forceps without broad shining area; anterior claspers not deeply grooved ..... 24

24. Hypopygium very small; a single very long bristle on anterior margin of posterior claspers; a few long curved bristles at tip of V of fifth sternite .....*Sarcophaga rapax* Walker  
 Hypopygium normal size; posterior claspers without long bristles; fifth sternite without long curved bristles at apex of V ..... 25
25. Ædeagus with a large hump on the back side near the apex; the diverging lobes of the V of the fifth sternite covered with short, stout, black bristles .....*Sarcophaga houghi* Aldrich  
 Ædeagus without hump ..... 26
26. Arms of the V of the fifth sternite very widely divergent, the portion of sternite around the union of V covered with strong bristles; distal segment of ædeagus very broad and blunt ..... 27  
 Species with different characters ..... 28
27. Accessory plate covered with short bristles only; tip of ædeagus with a process curving forward which is cut off bluntly on front apex and ædeagus only slightly narrowed at junction of its two segments  
*Sarcophaga cooleyi* Parker  
 Accessory plate with long bristles at its apex; the process at tip of ædeagus ends in a sharp point and the ædeagus is very much narrowed at junction of the two segments.....*Sarcophaga bullata* Parker
28. Arms of V of fifth sternite long, slender and sparsely covered with slender hairs, at the union of the V arms are two circular pads which are densely covered with bristles; anal forceps have abundant short, stiff erect hairs on the front and back sides just beyond their lower angle but the extreme tips of forceps are bare  
*Sarcophaga johnsoni* Aldrich  
 Circular pads lacking on fifth sternite and some true strong bristles on fifth sternite; characteristic groups of short, stiff erect hairs lacking on anal forceps ..... 29
29. Tips of ædeagus with five characteristic slender processes (*misera* group) ..... 33  
 Tips of ædeagus without the long slender processes ..... 30
30. The entire hypopygium black ..... 31  
 At least the second segment of hypopygium red ..... 32
31. Posterior clasper with a long bristle near base; apex of ædeagus with a raised light colored piece extending around its tip  
*Sarcophaga nox* Hall  
 Posterior clasper without long bristle near base; raised light colored piece lacking on apex of ædeagus .....*Sarcophaga sinuata* Meig.
32. Anal forceps with a hump on the caudal side just before the apex; and the front side concave to form a hooked tip; the apex of the ædeagus with two long slender processes which are distinctly widened at the apices .....*Sarcophaga securifera* Vill.  
 Anal forceps without hump; processes when present on the ædeagus lack the enlarged apices ..... 35

33. Both hypopygial segments black; processes arising from apex of ædeagus slender and the ones curved around to the front are toothed at the apex .....*Sarcophaga misera* var. *harpax* Pand.  
At least the second segment of hypopygium wholly red; processes at apex of ædeagus not toothed at tip ..... 34
34. First segment of hypopygium generally brownish black; distal processes of ædeagus long and very slender  
*Sarcophaga misera* var. *exuberans* Pand.  
Both segments of hypopygium red; distal processes of the ædeagus shorter and thicker .....*Sarcophaga misera* var. *sarracenioides* Ald.
35. Anal forceps in back view contiguous to the tip ..... 41  
Anal forceps not contiguous to the tip ..... 36
36. Posterior claspers much enlarged and attached to ninth sternite for at least half their length, a row of long bristles on caudal margin of posterior claspers; anterior claspers greatly curved, toothed, and with a long bristle near the base .....*Hypopelta serofa* Aldrich  
Anterior and posterior claspers normal ..... 37
37. Anterior clasper slender, widened apically, the tip excised to form a distinct claw; arms of fifth sternite black  
*Sarcophaga sarraceniæ* Riley
38. Apex of ædeagus ending caudad in a keel which turns sharply forward in the form of a hook; anal forceps excised in front to form an apical tooth ..... 40  
Apical segment of ædeagus very wide and without a distinct keel at apex; anal forceps not excised in front to form an apical tooth 39
39. Apex of anal forceps with a row of short bristles on front and back sides just back of tip; tip of anal forceps from side view resembles a head of a bird .....*Sarcophaga utilis* Aldrich  
Apex of anal forceps without bristles and not resembling a head of a bird ..... 42
40. Anterior clasper dished on the anterior surface; the anterior process of the apex of the ædeagus, when viewed from the back, appears like a broad scoop with its center curved back and the caudal keel comes up around it .....*Sarcophaga sima* Aldrich  
Anterior clasper not dished but with a notch at the apex, the front margin of apex of ædeagus somewhat rectangular in shape  
*Sarcophaga parallela* Aldrich
41. Forceps with a lateral process near tip .....*Sarcophaga cingarus* Aldrich  
Forceps without lateral process near tip  
*Sarcophaga niagarana* Parker
42. Forceps cleft nearly half their length; ædeagus large and apical circle lacking .....*Sarcophaga barbata* Thompson  
Tips of anal forceps separated only a very short distance; ædeagus moderate size and its apical end shaped to form a semicircle when viewed toward the tip .....*Sarcophaga yorkii* Parker

KEY TO SEPARATE FEMALE SARCOPHAGINÆ

1. Three distinct postsutural dorsocentrals ..... 2  
 Four postsutural dorsocentrals, or else the anterior ones of the postsutural series indistinct, hardly differentiated from hairs ..... 19
2. Genital segments mostly black ..... 3  
 Genital segments red or reddish yellow ..... 5
3. Arista bare; epaulets yellowish brown  
*Laccoprosopa sarcophagina* Town.  
 Arista long plumose; epaulets black ..... 4
4. Anterior acrostichals absent, mid-femur with patch of yellow hairs on apical third of front side ..... *Sarcophaga sinuata* Meig.  
 Anterior acrostichals present; mid-femur without yellow hairs; palpi yellow ..... *Sarcophaga hunteri* Hough
5. Anterior acrostichals absent, not differentiated from hairs ..... 6  
 Anterior acrostichals present ..... 10
6. First vein hairy, scutellum with apical bristles, small species  
*Sarcophaga rapax* Walker  
 First vein bare, larger species ..... 7
7. Second abdominal segment with median marginal bristles, ground color of ventral portion of abdomen largely red  
*Sarcophaga fletcheri* Aldrich  
 Second abdominal segment without median marginal bristles, ground color of abdomen largely black ..... 8
8. Prescutellar bristles absent; arista long and thin, short plumose; palpi black ..... *Hypopelta scrofa* Aldrich  
 Species lacking the above grouping of characters ..... 9
9. Palpi black; arista long plumose ..... *Sarcophaga bisetosa* Parker  
 Palpi yellow; plumosity of arista only median length  
*Sarcophaga ravinia* Parker
10. Second abdominal segment with erect median marginal bristles ..... 11  
 Second abdominal segment without erect median marginal bristles ... 13
11. Epaulets yellow, abundant whitish beard ..... *Sarcophaga atlanis* Aldrich  
 Epaulets black, beard black ..... 12
12. Median marginal bristles on second abdominal segment erect and close together, fourth abdominal segment entirely black, larvipositor sharp and bent forward ..... *Sarcophaga setigera* Aldrich  
 Median marginal bristles when present on second abdominal segment not erect and considerable distance apart, fourth abdominal segment yellow apically, larvipositor rounded and not bent forward  
*Sarcophaga excisa* Aldrich
13. Three maginal pairs of bristles on scutellum ..... 14  
 Two long marginal pairs of bristles on scutellum ..... 16
14. Sides of fourth abdominal segment nearly covering fourth sternite, apical edges of fourth segment rapidly separating, forming a V, and exposing the red fifth sternite  
*Metoposarcophaga importuna* Walker

- Fourth sternite widely exposed as the fourth tergites are widely separated ventrally ..... 15
15. Anterior cross-vein infuscated ..... *Sarcophaga cimbicis* Town.  
Anterior cross-vein not infuscated ..... *Sarcophaga latisterna* Parker
16. Epaulets yellow, mid tibiae with two bristles on outer front side  
*Sarcophaga pusiola* V. d. W.  
Epaulets black ..... 17
17. Wings slightly smoky, hind calypters light brown with a white margin  
*Sarcophaga alcedo* Aldrich  
Wings hyaline, calypters white ..... 18
18. Fourth abdominal segment yellow apically, genital orifice rounded and surface of dorsal half without bristles  
*Sarcophaga excisa* Aldrich  
Fourth abdominal segment entirely black, yellow larvipositor pointed and the surface of dorsal portion covered with bristles  
*Sarcophaga reversa* Aldrich
19. Impression of the bucca, near the vibrissal angle, large, conspicuously submerged below the surface level of surrounding sclerite; vibrissae placed at least the length of second antennal joint above the oral margin; ovipositor drawn out into a long slender point ..... 20  
Species lacking the above combination of characters ..... 21
20. Fourth abdominal segment and the hypopygial segments covered with golden yellow pollinose hairs ..... *Macronichia aurata* Coq.  
Fourth abdominal segment and the hypopygial segments covered with gray pollinose hairs ..... *Macronichia confundens* Town.
21. Genital segments mostly black ..... 22  
Genital segments entirely red or reddish yellow ..... 24
22. Palpi black ..... *Sarcophaga aldrichi* Parker  
Palpi yellow ..... 23
23. Third abdominal segment with only a pair of median marginal bristles  
*Sarcophaga johnsoni* Aldrich  
Third abdominal segment with complete row of marginal bristles; abdomen with three rows of shining black spots on second, third, and fourth segments. Eastern species ..... *Wohlfahrtia vigil* Walker
24. Anterior acrostichals present ..... 25  
Anterior acrostichals absent ..... 29
25. Epaulets black, dark yellow palpi which are rather long and broad  
*Sarcophaga flavipalpis* Aldrich  
Epaulets largely yellow; palpi black ..... 26
26. First vein hairy ..... 27  
First vein bare ..... 28
27. Middle femur with two bristles on outer front side  
*Sarcophaga stimulans* Walker  
Middle femur with more than two bristles on outer front side  
*Sarcophaga latisetosa* Parker

28. Parafrontals, parafacials and front half of bucca with strong ochraceous pollinose; thorax and abdomen with yellowish pollen  
*Sarcophaga sueta* V. d. W.  
 Yellowish pollen replaced by gray pollinose, with reflections that are rather brownish than yellow .....*Sarcophaga l'herminieri* Rob.-Des.
29. Prescutellar bristles present ..... 30  
 Prescutellar bristles absent .....*Sarcophaga hæmorrhoidalis* Fall.
30. Fifth vein with strong setæ along vein on the upper side of the wing  
*Johnsoni borealis* Reinhard  
 Fifth vein without setæ ..... 31
31. At least one-fourth of beard white ..... 32  
 Beard containing no white hairs ..... 37
32. Whitish beard of metacephalon extends well forward of the suture, blending with the black hairs ..... 33  
 Whitish beard not extending beyond the suture and blending with the black hairs ..... 35
33. Single row of black bristles behind eyes, bucca with abundant white beard which also extends over back of head up to row of black hairs, dorsal marginal bristles lacking on third abdominal segment  
*Sarcophaga securifera* Vill.  
 Not with above combination of characters ..... 34
34. A single row of bristles in cheek groove extending nearly the entire height of parafacials .....*Sarcophaga barbata* Thompson  
 Bristles on lateral sides of parafacials irregularly arranged and not in a single row .....*Sarcophaga bullata* Parker
35. Middle tibiæ with three bristles on the outer front, a group of parafacial macrochètæ present, three distinct rows of black hairs behind eyes, genital orifice triangular in shape and fringed with bristles above .....*Sarcophaga misera* var. *sarracenioides* Ald.  
 Characters not in the above combination ..... 36
36. Fourth abdominal segment yellow apically, parafacial bristles not arranged in a distinct row .....*Sarcophaga cistudinis* Aldrich  
 Fourth abdominal segment entirely black, a row of strong bristles extending nearly the entire length of parafacials  
*Sarcophaga scoparia* var. *nearctica* Parker
37. The hind and mid-femur yellowish red .....*Sarcophaga ventricosa* V. d. W.  
 The hind and mid-femur dark colored (black)  
*Sarcophaga cingarus* Aldrich

## MISERA GROUP

The species placed in this group have been recognized only as varieties of *misera*, the first species described in the group. Parker (1919) and Hardy (1927) gave the history of this group and so it will not be repeated here. Although there is an unusually close resemblance of the male hypopygium in all the species

in the *misera* group the males may be separated from each other. On the other hand it is very difficult to separate the females from other *Sarcophaga* which do not belong in the *misera* group. Additional studies may show that these species should be raised from the rank of varieties to species and place them in a subgenus. The writer would not go further as it does not seem wise to erect a genus based upon the characters of only one sex. A clear understanding of the group can be secured only by extensive rearings and a careful study of all stages.

*Sarcophaga misera* var. *exuberans* Pand.

1896. Pandellé, Rev. Ent., vol. 15, p. 186.  
 1912. Böttcher (*S. tuberosa* var. *exuberans* P.), Deutsch. Ent. Zeitschr., p. 735.  
 1916. Aldrich, *Sarcophaga* and Allies, p. 232.  
 1919. Parker (*S. dux* var. *exuberans* P.), Bull. Brooklyn Ent. Soc., vol. 14, p. 41.  
 1927. Hardy (*S. misera* var. *exuberans* P.), Proc. Linn. Soc. N. S. Wales, vol. 52, p. 452.

There are several very closely related forms that have been placed in the *misera* group by the different students of *Sarcophaga* which can be separated only by close study. Their separation depends largely upon genitalia characters which have been given in the keys. It should be kept in mind that *exuberans* has two rows of black cilia behind the eyes and white vestiture on the posterior portion of the cheeks.

Records.—Ithaca. June to August. Figure 98.

Jack (1935) reports this species to have been reared from dead insects in South Rhodesia, Africa. Callot (1935) reared the species from adults of *Stauroderus bicolor* Ch.

Type.—In the Pandellé collection in Paris.

*Sarcophaga misera* var. *harpax* Pand.

1896. Pandellé, Rev. Ent., vol. 15, p. 189.  
 1912. Böttcher (*S. tuberosa* var. *harpax* P.), Deutsch. Ent. Zeitschr., p. 735.  
 1916. Aldrich (*S. tuberosa* var. *harpax* P.), *Sarcophaga* and Allies, p. 171.



1919. Parker (*S. dux* var. *harpax* P.), Bull. Brooklyn Ent. Soc., vol. 14, p. 41.
1927. Hardy (*S. misera* var. *harpax* P.), Proc. Linn. Soc. N. S. Wales, vol. 52, p. 452.
1930. Aldrich, Proc. U. S. N. M., vol. 78, p. 27.

Only a single specimen of *Sarcophaga misera* var. *harpax* P. has been taken in New York State. This form is easily distinguished from all other varieties of *misera* that occur in America. The genitalia segments are entirely black. The processes at the apex of the aedeagus, which curve anteriorly, are distinctly toothed at their tips. The cheeks are clothed with black hairs.

Length.—8 to 12 mm.

Record.—Pelham Park, New York City. Figure 99.

Aldrich (1916) states that the fly has been reared from Gypsy moth caterpillars. Senior-White (1927) records the rearing of *harpax* from decaying snails.

Type.—In the Pandellé collection in Paris.

*Sarcophaga misera* var. *sarracenioides* Ald.

1916. Aldrich (*S. tuberosa* var. *sarracenioides*), *Sarcophaga* and Allies, p. 227.
1919. Parker (*S. dux* var. *sarracenioides* A.), Bull. Brooklyn Ent. Soc., vol. 14, p. 41.
1927. Hardy (*S. misera* var. *sarracenioides* A.), Proc. Linn. Soc. N. S. Wales, vol. 52, p. 452.

This species, *sarracenioides*, is one of the most common *Sarcophaga* occurring in New York. There is a single row of strong black cilia and two other rows of weaker black cilia behind the eyes. The vestiture of the cheeks is black.

Length.—8 to 13 mm.

Records.—Axton; Ithaca; New York City; *L. I.*: Cold Spring Harbor; Babylon; Half-way Hollow Hills. May to September. Figures 100, 101 and 102.

A very wide range of rearings have been reported for this species. It is certain in many cases that living insects have been parasitized. Aldrich (1916) reported 45 adults from grasshoppers at widely distributed localities; 1 adult from the western cricket in British Columbia; 5 adults from *Heliopila unipuncta* in Oklahoma; 23 adults from *Lachnosterna* sp. in Kansas; 2

adults from *Eleodes tricostata* in Oklahoma; 2 adults from *Allo-rhina nitida* in Virginia and 66 adults from carrion in Texas. Davis (1919) found the fly parasitizing *Phyllophaga* sp. in Illinois. Treherne and Buckell (1924) reported parasitism by this fly on grasshoppers in British Columbia. Knipling (1936) reared this species from meat. The writer in 1935 found that *sarracenioides* would larviposit on the inner surface of a funnel of a beetle trap above dying Asiatic garden beetles and that the first instar maggots would drop about six inches to reach the bodies of the beetles.

Holotype and allotype.—Male and female, No. 20551, U. S. N. M.

#### BOETTCHERIA GROUP

Parker (1914) described *Boettcheria* as a new genus and placed three species, *bisetosa*, *cimbicis* T. (*fernaldi* P.) and *latisterna*, in the genus. The females were excluded from consideration in Parker's (1914) paper. Aldrich (1916) stated that the species are closely allied but expressed the doubt, "if the fact is best expressed by raising them to generic rank." The writer, under the discussion of the genus *Sarcophaga*, has pointed out additional hypopygial characters which are common to the flies in this group. It is hoped that opportunity may be secured to conduct additional studies later with the immature forms and the adult female flies which may show that it is advisable to place these species in a separate genus.

#### *Sarcophaga bisetosa* Parker

1914. Parker, Proc. Boston Soc. Nat. Hist., vol. 35, p. 69.

1916. Aldrich, *Sarcophaga* and Allies, p. 81.

Parker (1914) separated this species from the closely related *cimbicis* mainly by the absence of anterior acrostichals and only two sternopleurals while *cimbicis* has three sternopleurals. The enlarged tip of the aedeagus, which turns back caudad, separates this species from all the closely related species.

Length.—8 to 12 mm.

Records.—Ithaca; Albany; White Lake; Trenton Falls; Yonkers; *L. I.*: Half-way Hollow Hills. May to September. Figures 103, 104 and 105.

Information is not available about the immature stages.

Type.—Mass. Agri. College.

*Sarcophaga cimbicis* Townsend

1892. Townsend, Can. Ent., vol. 24, p. 126.

1896. Van der Wulp (*S. setulosa*), Biol. Cent. Am., vol. 2, p. 276.

1914. Parker (*S. fernaldi*), Proc. Boston Soc. Nat. Hist., vol. 35, p. 72.

1916. Aldrich, *Sarcophaga* and Allies, p. 79.

1930. Aldrich, Proc. U. S. Nat. Mus., vol. 78, p. 32.

The characters given in the two male and female keys easily separate this species from the two very closely related species (*bisetosa* and *latisterna*). In most localities *cimbicis* is more plentiful than either *bisetosa* or *latisterna*.

Length.—5 to 10 mm.

Records.—Erie Co.; Ithaca; Albany; Carmel; W. Nyaack; New York City; Tuxedo; Brewster; Poughkeepsie; Oneonta; Rome; Troy; *S.I.*: Watchogue; Ft. Wadsworth; *L.I.*: Babylon; Jericho; Riverhead; Heckscher State Park. May to October. Figures 106, 107 and 108.

Kelly (1914) recorded the species as a parasite of adult grasshoppers in Kansas. Aldrich (1916) recorded that the type species was reared at Brookings, S. Dak., from pupa of *Cimbex americana*. Hayes (1917) found the fly breeding in dead insects. Davis (1919) reared this species in Illinois from adult *Phyllophaga* sp. Sherman (1920) reared *cimbicis* from the green clover worm larva (*Plathypena scabra*). Breakey (1929, 1931) recorded the larva of the iris borer as a host of *cimbicis*. The writer (1929) found 40% of the adult beetles (*Xyloryctes satyrus*) had been parasitized by this fly at Jericho on Long Island. Experiments at that time tended to indicate that *cimbicis* would not larviposit upon dead insects. Knipling (1936) pressed larvæ from the female flies and reared them on meat. Decker (1931, 1932) in Iowa recorded the parasite from *Papaipema nebris* and *Epiblema otiosana*.

Type.—In University of Kansas.

*Sarcophaga latisterna* Parker

1914. Parker (*Boettcheria*), Proc. Boston Soc. Nat. Hist., vol. 35, p. 67.

1916. Aldrich, *Sarcophaga* and Allies, p. 77.

Two striking characters distinguish this species from the closely related forms found in New York. It has a long slender accessory plate and on the hind femur a group of striking long bristles which are present only on the distal end of the median row.

Length.—8 to 13 mm.

Records.—Grand Island; Ithaca; Karner; King Ferry; Rensselaer; *S.I.*: Arrochar; Wadsworth; New Dorp; New Brighton; Watchogue; Richmond; *L.I.*: Babylon; Half-way Hollow Hills. May to August. Figures 109, 110 and 111.

Aldrich (1916) and Chittenden (1926) listed the species as a parasite of the imported cabbage worm (*Pieris rapæ*). Phillips and King (1923) reared *latisterna* from the corn ear worm. Porter and Alden (1924) recorded a rearing from the larva of the canker worm. Breakey (1929) gave a record of rearing *latisterna* from the iris borer larva in Wisconsin. Knull (1932) reared the fly from the pupæ of *Ennomos subsignarius* in Pennsylvania. The writer (1929) recorded on October 1, 1926, adult *latisterna* flying thickly around the larvæ of *Anisota* sp. at Taunton Lakes, New Jersey. Although gravid female flies were abundant no parasitism was secured. Maggots were removed from gravid female flies and placed on dead insects. These maggots developed normally. Knipling (1936) also reared this species on meat after removing larvæ from the fly.

Type.—Male, in Mass. Agri. College.

#### RAVINIA GROUP

The genus *Ravinia* was erected by Desvoidy (1863) with *Sarcophaga haematodes* Meig. as genotype. Böttcher (1912, 1913) recognized the group only as a sub-genus. Parker (1914) returned *Ravinia* to generic rank and pointed out that, in addition to the frontal bristles diverging anteriorly, there was a striking resemblance in the male copulatory organs. Aldrich (1916) and Hall (1928) reduced the genus to sub-generic standing because as Aldrich stated, "the characters of the frontal row is less developed in the males," and, "there are many species outside the group which show it." Hall (1928) added the statement, "the course of the frontal bristles range from parallel in some species

to strongly divergent in others; all species possessing striking similar copulatory organs." No additional characters have been observed so the group is considered only as of sub-generic rank.

*Sarcophaga laakei* Hall

1931. Hall, Ann. Ent. Soc. Am., vol. 24, p. 181-182.

It is difficult to separate this species from the closely related form, *latisetosa*. The characters given in the key will separate the two species. This species occurs fairly common in the south but it has been taken only a few times on Long Island, New York, by Mr. F. S. Blanton.

Length.—6 to 7 mm.

Records.—*L.I.*: Babylon. June, August. Figure 112.

Knipling (1936) reared larvæ of *laakei* on meat.

Holotype.—No. 43264, U. S. N. M.

*Sarcophaga latisetosa* Parker

1914. Parker (*Ravinia*), Proc. Boston Soc. N. H., vol. 35, p. 63.

1916. Aldrich, *Sarcophaga* and Allies, p. 299.

1928. Hall, Ann. Ent. Soc. Am., vol. 21, p. 343.

The outer vertical bristles are present in this species but they are lacking in the closely related *stimulans* and the posterior clasper is much longer in *latisetosa* than in *stimulans*.

This species is very common in the northern part of the United States and Canada but it is taken in fewer numbers south.

Length.—6 to 7 mm.

Records.—Ithaca; McLean; Duck Lake; Herkimer; Tuxedo; Troy; Poughkeepsie; *L.I.*: Cold Spring Harbor; Babylon. June to September. Figures 113, 114 and 115.

Aldrich (1916) states that the larvæ of this species are excrement feeders. Professor G. W. Herrick reared twelve adults of this species at Ithaca from dog excrement in July 1912.

Holotype.—Male, in collection of Mass. Agri. College.

*Sarcophaga l'herminieri* R.D.

1830. Robineau-Desvoidy, Essai Sur les Myodaires, p. 339.

1837. Walker (*anxia*, *querula*, *avida*, *rediviva*, *aspera*, *rabida*, *acerba*, *comes*), Trans. Linn. Soc., vol. 17, p. 818-825.

1868. Thompson (*S. pallinervis*), Eugenes Resa, p. 535.  
 1914. Parker (*Ravinia communis*), Proc. Bost. Soc. N. H., vol. 35, p. 55.  
 1916. Aldrich (*S. communis*), *Sarcophaga* and Allies, p. 253.  
 1930. Aldrich, Proc. U. S. N. M., vol. 78, p. 13, 27, 28.

This scavenger species is the most common Scarophagid in New York State. It occurs in all parts of the state.

Length.—6 to 12 mm.

Records.—Tuxedo; Middleport; Rome; Trumbull Corners; Tear; Potsdam; Unionport; Buffalo; Ithaca; Mosholu; *S.I.*: New Brighton; Fort Wadsworth; *L.I.*: Flatbush; Sea Clift; Cold Spring Harbor; Gardiners Island; Wyandanch; Brooklyn. May to September. Figures 116, 117 and 118.

Parker (1914), Aldrich (1916) and Wilson (1932) have all recorded this species abundantly feeding and larvipositing on all kinds of mammal excrement. Knipling (1936) found that larvæ of this species would develop when placed upon either excrement or meat.

Type.—Museum of Natural History in Paris.

*Sarcophaga pusiola* V. d. W.

1896. Van der Wulp, Biol. Cent. Am. Dip., vol. 2, p. 278.  
 1914. Parker (*Ravinia peniculata*), Proc. Bost. Soc. N. H., vol. 35, p. 58.  
 1916. Aldrich (*S. peniculata*), *Sarcophaga* and Allies, p. 121.  
 1930. Aldrich, Proc. U. S. N. M., vol. 78, p. 33.

The superficial characters of this species are similar to *l'herminieri*. This species belongs to the three postsutural dorso-central group while *l'herminieri* has four postsutural dorsocentrals. The average size of *pusiola* is smaller than *l'herminieri*.

Length.—6 to 9 mm.

Records.—Redhook; Tuxedo; Tear; Upper Ausable; Olcott; Ithaca; *L.I.*: Cold Spring Harbor. June to September. Figures 119, 120 and 121.

Parker (1914) recorded rearing the larvæ of this species from dung. Knipling (1936) found that larvæ normally developed upon excrement but that they could develop upon meat.

*Sarcophaga stimulans* Walker

1848. Walker, List of Dip. Brit. Mus., p. 817.

1895. Van der Wulp (*S. vagabunda*), Biol. Cent. Am. Dip., vol. 2, p. 270.  
 1900. Coquillett (*S. quadrisetosa*), Ent. News, vol. 12, p. 17.  
 1914. Parker (*Ravinia quadrisetosa*), Proc. Bost. Soc. N. H., vol. 35, p. 60.  
 1916. Aldrich (*S. quadrisetosa*), Sarcophaga and Allies, pp. 296.  
 1917. Townsend (*Chætoravinia quadrisetosa*), Proc. Biol. Soc. Wash., vol. 30, p. 195.  
 1928. Hall (*S. quadrisetosa*), Ann. Ent. Soc. Am., vol. 21, p. 346.  
 1930. Aldrich, Proc. U. S. Nat. Mus., vol. 78, p. 15, 29.

Although this species occurs in New York it has never been taken as commonly as the closely related *latisetosa*. Hall (1928) reported *stimulans* more numerous south of the Ohio River than in the northern part of its range.

Length.—6 to 8 mm.

Records.—Yonkers; *S.I.*: Clove Valley; *L.I.*: Babylon. August. Figures 122, 123 and 124.

Aldrich (1916) and Greene (1926) reported that this fly is a very common excrement feeding species in its larvæ stage. Knippling (1936) reared this species from excrement but failed to secure development of larvæ upon meat.

Type.—In British Museum.

*Sarcophaga sueta* V. d. W.

1896. Van der Wulp, Biol. Cent. Am. Dip., vol. 2, p. 281.  
 1916. Aldrich (*S. communis* var. *ochracea*), *Sarcophaga* and Allies, p. 255.  
 1928. Hall (*S. ochracea*), Ann. Ent. Soc. Am., vol. 21, p. 340.  
 1930. Aldrich, Proc. U. S. N. M., vol. 78, p. 34.

For many years *sueta* was considered in America as a variety of *l'herminieri* but Greene (1926) pointed out distinct differences in the immature stages. Hall (1928) raised this form to the rank of species. This species occurs commonly from southern Ohio to the southern part of the United States. It has been taken on rare occasions on Long Island, New York.

Length.—6 to 12 mm.

Records.—*L.I.*: Babylon. August. Figures 125, 126 and 127.

Aldrich (1916), Lindquist (1936) and Knippling (1936) have pointed out that the larvæ of this species develop in excrement.

## TYPICAL SARCOPHAGA GROUP

The remaining species of the genus *Sarcophaga* are placed in this group. Additional study may show that it is desirable to divide this residuary group into smaller groups.

*Sarcophaga aculeata* Aldrich

1916. Aldrich, *Sarcophaga* and Allies, p. 143.

Although this species has not been recorded in New York State it is so widely distributed in the United States and Canada that it can be expected to occur here. According to Aldrich (1916) this species has been reared from the adults of several species of grasshoppers.

Holotype and allotype.—Male and female, No. 20526, U. S. N. M.

*Sarcophaga alcedo* Aldrich

1916. Aldrich, *Sarcophaga* and Allies, p. 132.

This species is close to *S. excisa* but it can be separated by the distinct yellow cast on the parafrontals and parafacials, wings slightly smoky and hind calypters light brown with a white margin. The genitalia differences are illustrated in the figures.

Length.—8 to 9 mm.

Records.—Although this species is widely distributed in the United States it has only been recorded in New York at Babylon, L.I., where Mr. F. B. Blanton has taken 12 specimens. August. Figures 128, 129 and 130.

The hosts of *alcedo* are not known.

Holotype and allotype.—Male and female, No. 20517, U. S. N. M.

*Sarcophaga aldrichi* Parker

1916. Parker, Jr. Econ. Ent., vol. 9, p. 438.

1916. Aldrich, *Sarcophaga* and Allies, p. 167.

This species belongs to a small group of flies with four post-sutural dorsocentral bristles, hind tibiae villous in the males and the hypopygium entirely black. The males of this species may be separated from the closely related species in this group by the broad anal forceps with a large bare, shining area on their lower central portion and the deep groove on the large thick anterior



clasper. The female has black genital segments with an oval aperture which is surrounded by dense bristles.

Length.—8 to 10 mm.

Records.—Ithaca; Oneonta; Axton; Mt. Whiteface; L.I.: Babylon; Herscher State Park. May to the middle of July. Figures 131, 132 and 133.

Adults of this species occur commonly around infestations of the forest tent caterpillar (*Malacosoma disstria*). Cæsar (1916) reported in Ontario that 90% of the larvæ of the forest tent caterpillar were parasitized by this fly. Parker (1916) recorded a rearing from *Porthetria dispar*. It has also been reared according to Glendenning (1914) from *Stilpnotia salicis* in British Columbia.

Holotype.—Male, in collection of Mass. Agri. College. Paratypes are in the U. S. N. M.

*Sarcophaga atlanis* Aldrich

1916. Aldrich, *Sarcophaga* and Allies, p. 100.

Although this species may be confused with *hunteri* it may be distinguished by the black palpi and the lack of a tuft of long black hair which is found on each anal forcep of *hunteri*.

Length.—5 to 8 mm.

Records.—McLean; Herkimer; L.I.: Islip. June to August. Figures 134, 135 and 136.

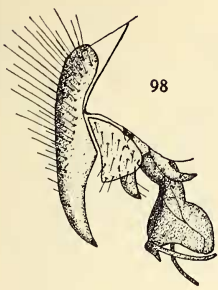
Aldrich (1916) pointed out that this species was a parasite of grasshoppers. Mr. J. W. H. Rehn very kindly permitted the writer to publish data taken during the summer of 1936 when he secured information by rearings to show that approximately 25% of the adults of *Dendrotettix quercus* P. at Mt. Misery, New Jersey were parasitized by *Sarcophaga atlanis*.

Holotype and allotype.—Male and female, No. 20506, U. S. N. M.

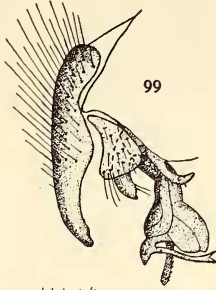
(To be continued)

## PLATE VIII

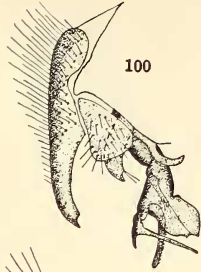
- Figure 98. Lateral view of external genitalia of *Sarcophaga misera* var. *exuberans* Pand.
- Figure 99. Lateral view of external genitalia of *Sarcophaga misera* var. *harpax* Pand.
- Figure 100. Lateral view of external genitalia of *Sarcophaga misera* var. *sarracenioides* Ald.
- Figure 101. Fifth sternum of *Sarcophaga misera* var. *sarracenioides* A.
- Figure 102. Rear view of anal forceps of *Sarcophaga misera* var. *sarracenioides* Ald.
- Figure 103. Lateral view of external genitalia of *Sarcophaga bisetosa* Parker.
- Figure 104. Fifth sternum of *Sarcophaga bisetosa* Parker.
- Figure 105. Rear view of anal forceps of *Sarcophaga bisetosa* Parker.
- Figure 106. Lateral view of external genitalia of *Sarcophaga cimbicis* T.
- Figure 107. Fifth sternum of *Sarcophaga cimbicis* Townsend.
- Figure 108. Rear view of anal forceps of *Sarcophaga cimbicis* Town.
- Figure 109. Lateral view of external genitalia of *Sarcophaga latisterna* Parker.



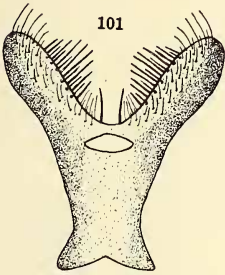
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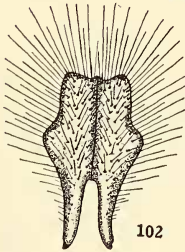
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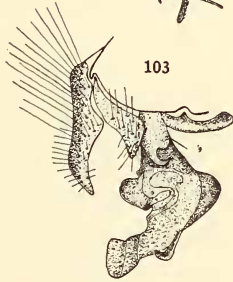
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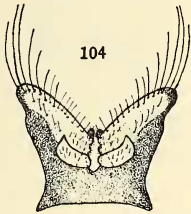
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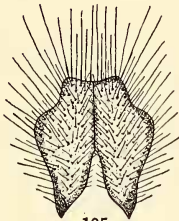
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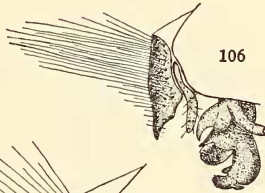
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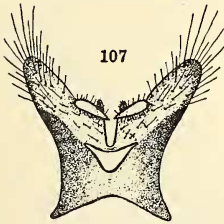
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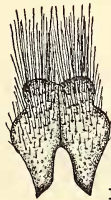
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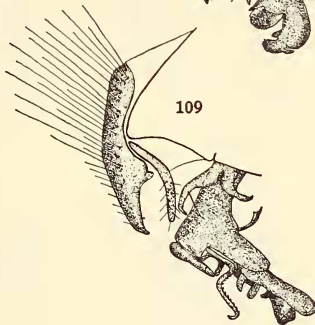
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107



108

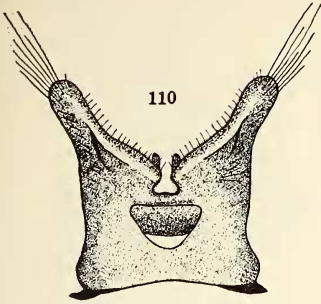


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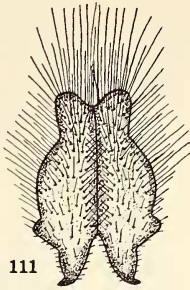
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## PLATE IX

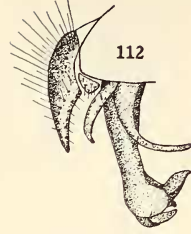
- Figure 110. Fifth sternum of *Sarcophaga latisterna* Parker.  
Figure 111. Rear view of anal forceps of *Sarcophaga latisterna* Park.  
Figure 112. Lateral view of external genitalia of *Sarcophaga laakei* Hall.  
Figure 113. Lateral view of external genitalia of *Sarcophaga latisetosa* Parker.  
Figure 114. Fifth sternum of *Sarcophaga latisetosa* Parker.  
Figure 115. Rear view of anal forceps of *Sarcophaga latisetosa* Park.  
Figure 116. Lateral view of external genitalia of *Sarcophaga l'herminieri* R.-D.  
Figure 117. Fifth sternum of *Sarcophaga l'herminieri* R.-D.  
Figure 118. Rear view of anal forceps of *Sarcophaga l'herminieri* Rob.-Des.  
Figure 119. Lateral view of external genitalia of *Sarcophaga pusiola* V. d. W.  
Figure 120. Fifth sternum of *Sarcophaga pusiola* V. d. W.  
Figure 121. Rear view of anal forceps of *Sarcophaga pusiola* V. d. W.



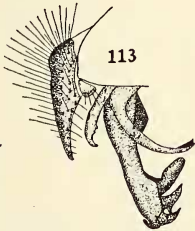
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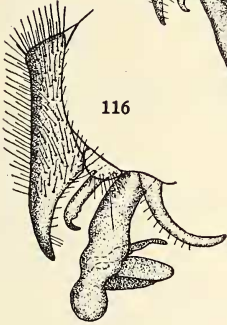
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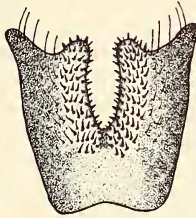
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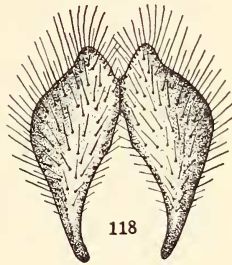
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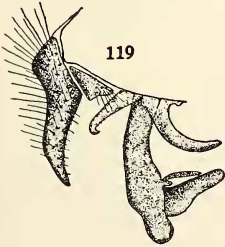
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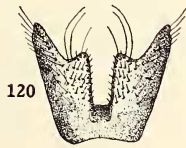
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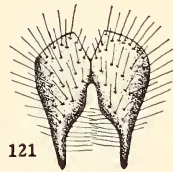
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119



120

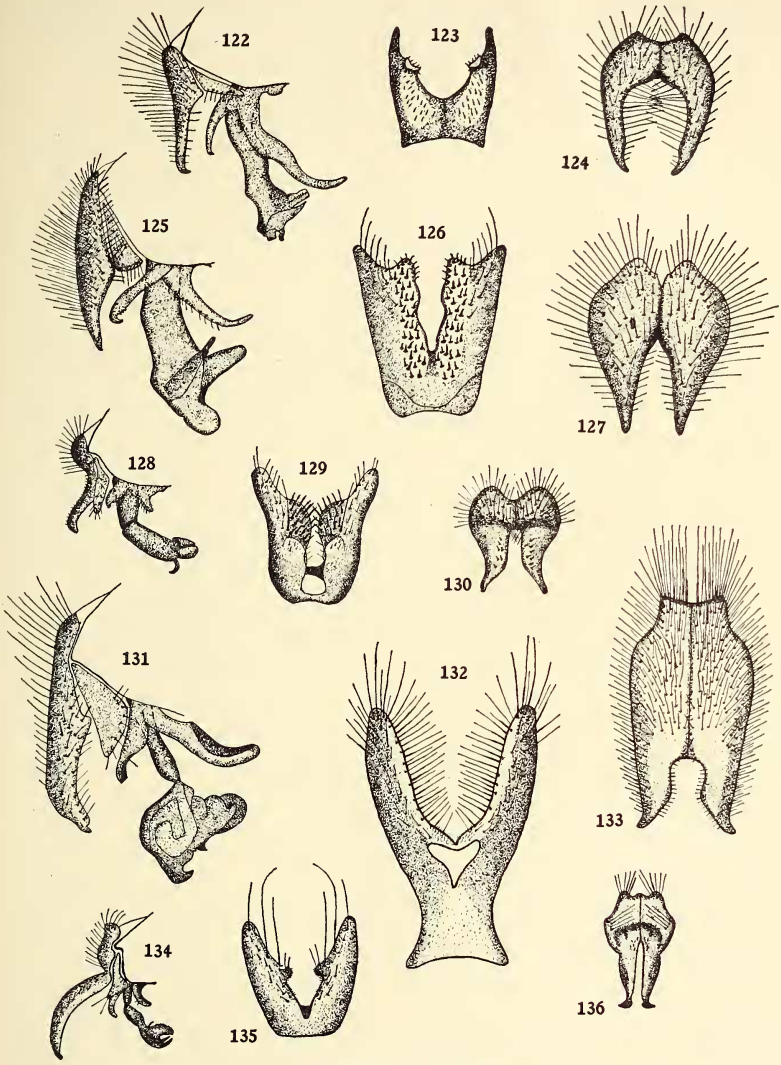


121

SARCOPHAGINÆ

## PLATE X

- Figure 122. Lateral view of external genitalia of *Sarcophaga stimulans* Walker.
- Figure 123. Fifth sternum of *Sarcophaga stimulans* Walker.
- Figure 124. Rear view of anal forceps of *Sarcophaga stimulans* Walk.
- Figure 125. Lateral view of external genitalia of *Sarcophaga sueta* V. d. W.
- Figure 126. Fifth sternum of *Sarcophaga sueta* V. d. W.
- Figure 127. Rear view of anal forceps of *Sarcophaga sueta* V. d. W.
- Figure 128. Lateral view of external genitalia of *Sarcophaga alcedo* Aldrich.
- Figure 129. Fifth sternum of *Sarcophaga alcedo* Aldrich.
- Figure 130. Rear view of anal forceps of *Sarcophaga alcedo* Aldrich.
- Figure 131. Lateral view of external genitalia of *Sarcophaga aldrichi* Parker.
- Figure 132. Fifth sternum of *Sarcophaga aldrichi* Parker.
- Figure 133. Rear view of anal forceps of *Sarcophaga aldrichi* Parker.
- Figure 134. Lateral view of external genitalia of *Sarcophaga atlanis* Aldrich.
- Figure 135. Fifth sternum of *Sarcophaga atlanis* Aldrich.
- Figure 136. Rear view of anal forceps of *Sarcophaga atlanis* Aldrich.



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